

SEQUENCE LISTING

<110> KUMIAI CHEMICAL INDUSTRY CO., LTD

National Institute of Agrobiological Sciences

<120> A gene coding for aceto-lactate-synthetase

<130> PH-1733-PCT

<150> JP 2002-95721

<151> 2002-03-29

<160> 34

<170> PatentIn Ver. 2.0

<210> 1

<211> 2301

<212> DNA

<213> Oryza sativa var. kinmaze

<220>

<221> CDS

<222> (48)..(1979)

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Thr Ala Ala Ala Ala Ala Ala Ala Leu Ser Ala Ala Ala Thr Ala Lys	
5 10 15	
acc ggc cgt aag aac cac cag cga cac cac gtc ctt ccc gct cga ggc	152
Thr Gly Arg Lys Asn His Gln Arg His His Val Leu Pro Ala Arg Gly	
20 25 30 35	
cgg gtg ggg gcg gcg gcg gtc agg tgc tgc gcg gtg tcc ccg gtc acc	200
Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser Pro Val Thr	
40 45 50	
ccg ccg tcc ccg gcg ccg ccg gcc acg ccg ctc cgg ccg tgg ggg ccg	248
Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro Trp Gly Pro	
55 60 65	
gcc gag ccc cgc aag ggc gcg gac atc ctc gtg gag gcg ctg gag cgg	296
Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala Leu Glu Arg	
70 75 80	
tgc ggc gtc agc gac gtg ttc gcc tac ccg ggc ggc gcg tcc atg gag	344
Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala Ser Met Glu	
85 90 95	
atc cac cag gcg ctg acg cgc tcc ccg gtc atc acc aac cac ctc ttc	392
Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn His Leu Phe	
100 105 110 115	

cgc cac gag cag ggc gag gcg ttc gcg gcg tcc ggg tac gcg cgc gcg 440
 Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr Ala Arg Ala

120 125 130

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 Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro Gly Ala Thr

135 140 145

aac ctc gtg tcc gcg ctc gcc gac gcg ctg ctc gac tcc gtc ccg atg 536
 Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser Val Pro Met

150 155 160

gtc gcc atc acg ggc cag gtc cac agc cgc atg atc ggc acc gac gcc 584
 Val Ala Ile Thr Gly Gln Val His Ser Arg Met Ile Gly Thr Asp Ala

165 170 175

ttc cag gag acg ccc ata gtc gag gtc acc cgc tcc atc acc aag cac 632
 Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile Thr Lys His

180 185 190 195

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 Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val Ile Gln Glu

200 205 210

gcc ttc ttc ctc gcg tcc tcg ggc cgt cct ggc ccg gtg ctg gtc gac 728
 Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val Leu Val Asp

215 220 225

atc ccc aag gac atc cag cag cag atg gcc gtg ccg gtc tgg gac acc 776

Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val Trp Asp Thr
230 235 240

tcg atg aat cta cca ggg tac atc gca cgc ctg ccc aag cca ccc gcg 824
Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys Pro Pro Ala
245 250 255

aca gaa ttg ctt gag cag gtc ttg cgt ctg gtt ggc gag tca cgg cgc 872
Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu Ser Arg Arg
260 265 270 275

ccg att ctc tat gtc ggt ggt ggc tgc tct gca tct ggt gac gaa ttg 920
Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly Asp Glu Leu
280 285 290

cgc tgg ttt gtt gag ctg act ggt atc cca gtt aca acc act ctg atg 968
Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr Thr Leu Met
295 300 305

ggc ctc ggc aat ttc ccc agt gac gac ccg ttg tcc ctg cgc atg ctt 1016
Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu Arg Met Leu
310 315 320

ggg atg cat ggc acg gtg tac gca aat tat gcc gtg gat aag gct gac 1064
Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp Lys Ala Asp
325 330 335

ctg ttg ctt gcg ttt ggt gtg cgg ttt gat gat cgt gtg aca ggg aaa 1112
Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val Thr Gly Lys

340	345	350	355	
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Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile Asp Ile Asp				
	360	365	370	
cca gca gag att gga aag aac aag caa cca cat gtg tca att tgc gca				1208
Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser Ile Cys Ala				
	375	380	385	
gat gtt aag ctt gct tta cag ggc ttg aat gct ctg cta caa cag agc				1256
Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu Gln Gln Ser				
	390	395	400	
aca aca aag aca agt tct gat ttt agt gca tgg cac aat gag ttg gac				1304
Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn Glu Leu Asp				
	405	410	415	
cag cag aag agg gag ttt cct ctg ggg tac aaa act ttt ggt gaa gag				1352
Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe Gly Glu Glu				
420	425	430	435	
atc cca ccg caa tat gcc att cag gtg ctg gat gag ctg acg aaa ggt				1400
Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu Thr Lys Gly				
	440	445	450	
gag gca atc atc gct act ggt gtt ggg cag cac cag atg tgg gcg gca				1448
Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met Trp Ala Ala				
	455	460	465	

caa tat tac acc tac aag cgg cca cgg cag tgg ctg tct tcg gct ggt 1496

Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser Ser Ala Gly

470

475

480

ctg ggc gca atg gga ttt ggg ctg cct gct gca gct ggt gct tct gtg 1544

Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly Ala Ser Val

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gct aac cca ggt gtc aca gtt gtt gat att gat ggg gat ggt agc ttc 1592

Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp Gly Ser Phe

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ctc atg aac att cag gag ctg gca ttg atc cgc att gag aac ctc cct 1640

Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu Asn Leu Pro

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525

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gtg aag gtg atg gtg ttg aac aac caa cat ttg ggt atg gtg gtg caa 1688

Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met Val Val Gln

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tgg gag gat agg ttt tac aag gcg aat agg gcg cat aca tac ttg ggc 1736

Trp Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr Tyr Leu Gly

550

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aac ccg gaa tgt gag agc gag ata tat cca gat ttt gtg act att gct 1784

Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val Thr Ile Ala

565

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575

aag ggg ttc aat att cct gca gtc cgt gta aca aag aag agt gaa gtc 1832
Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys Ser Glu Val
580 585 590 595

cgt gcc gcc atc aag aag atg ctc gag act cca ggg cca tac ttg ttg 1880
Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro Tyr Leu Leu
600 605 610

gat atc atc gtc ccg cac cag gag cat gtg ctg cct atg atc cca agt 1928
Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met Ile Pro Ser
615 620 625

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Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly Arg Thr Val
630 635 640

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Tyr

ctgaatgacc cataaagagt ggtatgccta tgatgtttgt atgtgctcta tcaataacta 2089

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<210> 2

<211> 644

<212> PRT

<213> Oryza sativa var. kinmaze

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Ala Arg Gly Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser
35 40 45

Pro Val Thr Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro
50 55 60

Trp Gly Pro Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala
65 70 75 80

Leu Glu Arg Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala
85 90 95

Ser Met Glu Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn
100 105 110

His Leu Phe Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr

115	120	125
Ala Arg Ala Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro		
130	135	140
Gly Ala Thr Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser		
145	150	155 160
Val Pro Met Val Ala Ile Thr Gly Gln Val His Ser Arg Met Ile Gly		
165	170	175
Thr Asp Ala Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile		
180	185	190
Thr Lys His Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val		
195	200	205
Ile Gln Glu Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val		
210	215	220
Leu Val Asp Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val		
225	230	235 240
Trp Asp Thr Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys		
245	250	255
Pro Pro Ala Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu		
260	265	270

Ser Arg Arg Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly
275 280 285

Asp Glu Leu Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr
290 295 300

Thr Leu Met Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu
305 310 315 320

Arg Met Leu Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp
325 330 335

Lys Ala Asp Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val
340 345 350

Thr Gly Lys Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile
355 360 365

Asp Ile Asp Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser
370 375 380

Ile Cys Ala Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu
385 390 395 400

Gln Gln Ser Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn
405 410 415

Glu Leu Asp Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe
420 425 430

Gly Glu Glu Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu
435 440 445

Thr Lys Gly Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met
450 455 460

Trp Ala Ala Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser
465 470 475 480

Ser Ala Gly Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly
485 490 495

Ala Ser Val Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp
500 505 510

Gly Ser Phe Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu
515 520 525

Asn Leu Pro Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met
530 535 540

Val Val Gln Trp Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr
545 550 555 560

Tyr Leu Gly Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val
565 570 575

Thr Ile Ala Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys

580

585

590

Ser Glu Val Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro

595

600

605

Tyr Leu Leu Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met

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Ile Pro Ser Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly

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635

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Arg Thr Val Tyr

<210> 3

<211> 2300

<212> DNA

<213> Oryza sativa var. kinmaze

<220>

<221> CDS

<222> (48)..(1979)

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Met Ala Thr

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 Thr Ala Ala Ala Ala Ala Ala Ala Leu Ser Ala Ala Ala Thr Ala Lys

5 10 15

acc ggc cgt aag aac cac cag cga cac cac gtc ctt ccc gct cga ggc 152
 Thr Gly Arg Lys Asn His Gln Arg His His Val Leu Pro Ala Arg Gly

20 25 30 35

cgg gtg ggg gcg gcg gcg gtc agg tgc tcg gcg gtg tcc ccg gtc acc 200
 Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser Pro Val Thr

40 45 50

ccg ccg tcc ccg gcg ccg ccg gcc acg ccg ctc cgg ccg tgg ggg ccg 248
 Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro Trp Gly Pro

55 60 65

gcc gag ccc cgc aag ggc gcg gac atc ctc gtg gag gcg ctg gag ccg 296
 Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala Leu Glu Arg

70 75 80

tgc ggc gtc agc gac gtg ttc gcc tac ccg ggc ggc gcg tcc atg gag 344
 Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala Ser Met Glu

85 90 95

atc cac cag gcg ctg acg cgc tcc ccg gtc atc acc aac cac ctc ttc 392
 Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn His Leu Phe

100 105 110 115

cgc cac gag cag ggc gag gcg ttc gcg gcg tcc ggg tac gcg cgc gcg 440

Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr Ala Arg Ala	
120 125 130	
tcc ggc cgc gtc ggg gtc tgc gtc gcc acc tcc ggc ccc ggg gca acc	488
Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro Gly Ala Thr	
135 140 145	
aac ctc gtg tcc gcg ctc gcc gac gcg ctg ctc gac tcc gtc ccg atg	536
Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser Val Pro Met	
150 155 160	
gtc gcc atc acg ggc cag gtc cac cgc cgc atg atc ggc acc gac gcc	584
Val Ala Ile Thr Gly Gln Val His Arg Arg Met Ile Gly Thr Asp Ala	
165 170 175	
ttc cag gag acg ccc ata gtc gag gtc acc cgc tcc atc acc aag cac	632
Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile Thr Lys His	
180 185 190 195	
aat tac ctt gtc ctt gat gtg gag gac atc ccc cgc gtc ata cag gaa	680
Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val Ile Gln Glu	
200 205 210	
gcc ttc ttc ctc gcg tcc tcg ggc cgt cct ggc ccg gtg ctg gtc gac	728
Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val Leu Val Asp	
215 220 225	
atc ccc aag gac atc cag cag cag atg gcc gtg ccg gtc tgg gac acc	776
Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val Trp Asp Thr	

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tcg atg aat cta cca ggg tac atc gca cgc ctg ccc aag cca ccc gcg	824		
Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys Pro Pro Ala			
245	250	255	
aca gaa ttg ctt gag cag gtc ttg cgt ctg gtt ggc gag tca cgg cgc	872		
Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu Ser Arg Arg			
260	265	270	275
ccg att ctc tat gtc ggt ggt ggc tgc tct gca tct ggt gac gaa ttg	920		
Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly Asp Glu Leu			
280	285	290	
cgc tgg ttt gtt gag ctg act ggt atc cca gtt aca acc act ctg atg	968		
Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr Thr Leu Met			
295	300	305	
ggc ctc ggc aat ttc ccc agt gac gac ccg ttg tcc ctg cgc atg ctt	1016		
Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu Arg Met Leu			
310	315	320	
ggg atg cat ggc acg gtg tac gca aat tat gcc gtg gat aag gct gac	1064		
Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp Lys Ala Asp			
325	330	335	
ctg ttg ctt gcg ttt ggt gtg cgg ttt gat gat cgt gtg aca ggg aaa	1112		
Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val Thr Gly Lys			
340	345	350	355

att gag gct ttt gca agc agg gcc aag att gtg cac att gac att gat 1160

Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile Asp Ile Asp

360

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370

cca gca gag att gga aag aac aag caa cca cat gtg tca att tgc gca 1208

Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser Ile Cys Ala

375

380

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gat gtt aag ctt gct tta cag ggc ttg aat gct ctg cta caa cag agc 1256

Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu Gln Gln Ser

390

395

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aca aca aag aca agt tct gat ttt agt gca tgg cac aat gag ttg gac 1304

Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn Glu Leu Asp

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cag cag aag agg gag ttt cct ctg ggg tac aaa act ttt ggt gaa gag 1352

Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe Gly Glu Glu

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atc cca ccg caa tat gcc att cag gtg ctg gat gag ctg acg aaa ggt 1400

Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu Thr Lys Gly

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gag gca atc atc gct act ggt gtt ggg cag cac cag atg tgg gcg gca 1448

Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met Trp Ala Ala

455

460

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caa tat tac acc tac aag cgg cca cgg cag tgg ctg tct tcg gct ggt 1496
 Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser Ser Ala Gly
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ctg ggc gca atg gga ttt ggg ctg cct gct gca gct ggt gct tct gtg 1544
 Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly Ala Ser Val
 485 490 495

gct aac cca ggt gtc aca gtt gtt gat att gat ggg gat ggt agc ttc 1592
 Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp Gly Ser Phe
 500 505 510 515

ctc atg aac att cag gag ctg gca ttg atc cgc att gag aac ctc cct 1640
 Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu Asn Leu Pro
 520 525 530

gtg aag gtg atg gtg ttg aac aac caa cat ttg ggt atg gtg gtg caa 1688
 Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met Val Val Gln
 535 540 545

ttg gag gat agg ttt tac aag gcg aat agg gcg cat aca tac ttg ggc 1736
 Leu Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr Tyr Leu Gly
 550 555 560

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 Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val Thr Ile Ala
 565 570 575

aag ggg ttc aat att cct gca gtc cgt gta aca aag aag agt gaa gtc 1832

Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys Ser Glu Val
580 585 590 595

cgt gcc gcc atc aag aag atg ctc gag act cca ggg cca tac ttg ttg 1880
Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro Tyr Leu Leu
600 605 610

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Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met Ile Pro Ser
615 620 625

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Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly Arg Thr Val
630 635 640

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Tyr

ctgaatgacc cataaagagt ggtatgccta tgatgtttgt atgtgctcta tcaataacta 2089

aggtgtcaac tatgaacat atgctcttct gttttacttg tttgatgtgc ttggcatggt 2149

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<210> 4

<211> 644

<212> PRT

<213> Oryza sativa var. kinmaze

<400> 4

Met Ala Thr Thr Ala Ala Ala Ala Ala Ala Ala Leu Ser Ala Ala Ala

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Thr Ala Lys Thr Gly Arg Lys Asn His Gln Arg His His Val Leu Pro

20 25 30

Ala Arg Gly Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser

35 40 45

Pro Val Thr Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro

50 55 60

Trp Gly Pro Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala

65 70 75 80

Leu Glu Arg Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala

85 90 95

Ser Met Glu Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn

100 105 110

His Leu Phe Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr

115 120 125

Ala Arg Ala Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro
130 135 140

Gly Ala Thr Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser
145 150 155 160

Val Pro Met Val Ala Ile Thr Gly Gln Val His Arg Arg Met Ile Gly
165 170 175

Thr Asp Ala Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile
180 185 190

Thr Lys His Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val
195 200 205

Ile Gln Glu Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val
210 215 220

Leu Val Asp Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val
225 230 235 240

Trp Asp Thr Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys
245 250 255

Pro Pro Ala Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu
260 265 270

Ser Arg Arg Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly
20/56

275	280	285
Asp Glu Leu Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr		
290	295	300
Thr Leu Met Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu		
305	310	315 320
Arg Met Leu Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp		
325	330	335
Lys Ala Asp Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val		
340	345	350
Thr Gly Lys Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile		
355	360	365
Asp Ile Asp Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser		
370	375	380
Ile Cys Ala Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu		
385	390	395 400
Gln Gln Ser Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn		
405	410	415
Glu Leu Asp Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe		
420	425	430

Gly Glu Glu Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu
435 440 445

Thr Lys Gly Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met
450 455 460

Trp Ala Ala Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser
465 470 475 480

Ser Ala Gly Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly
485 490 495

Ala Ser Val Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp
500 505 510

Gly Ser Phe Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu
515 520 525

Asn Leu Pro Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met
530 535 540

Val Val Gln Leu Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr
545 550 555 560

Tyr Leu Gly Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val
565 570 575

Thr Ile Ala Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys
580 585 590

Ser Glu Val Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro

595

600

605

Tyr Leu Leu Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met

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Ile Pro Ser Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly

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635

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Arg Thr Val Tyr

<210> 5

<211> 2294

<212> DNA

<213> Oryza sativa var. kinmaze

<220>

<221> CDS

<222> (48)..(1979)

<400> 5

cccaaaccga gaaaccctcg ccgccgccgc cgccgccacc acccacc atg gct acg 56

Met Ala Thr

1

acc gcc gcg gcc gcg gcc gcc gcc ctg tcc gcc gcc gcg acg gcc aag 104

23/56

Thr	Ala	Ala	Ala	Ala	Ala	Ala	Ala	Ala	Leu	Ser	Ala	Ala	Ala	Thr	Ala	Lys	
	5						10						15				
acc	ggc	cgt	aag	aac	cac	cag	cga	cac	cac	gtc	ctt	ccc	gct	cga	ggc		152
Thr	Gly	Arg	Lys	Asn	His	Gln	Arg	His	His	Val	Leu	Pro	Ala	Arg	Gly		
	20					25				30					35		
cgg	gtg	ggg	gcg	gcg	gcg	gtc	agg	tgc	tcg	gcg	gtg	tcc	ccg	gtc	acc		200
Arg	Val	Gly	Ala	Ala	Ala	Val	Arg	Cys	Ser	Ala	Val	Ser	Pro	Val	Thr		
				40					45					50			
ccg	ccg	tcc	ccg	gcg	ccg	ccg	gcc	acg	ccg	ctc	cgg	ccg	tgg	ggg	ccg		248
Pro	Pro	Ser	Pro	Ala	Pro	Pro	Ala	Thr	Pro	Leu	Arg	Pro	Trp	Gly	Pro		
				55				60					65				
gcc	gag	ccc	cgc	aag	ggc	gcg	gac	atc	ctc	gtg	gag	gcg	ctg	gag	cgg		296
Ala	Glu	Pro	Arg	Lys	Gly	Ala	Asp	Ile	Leu	Val	Glu	Ala	Leu	Glu	Arg		
		70					75					80					
tgc	ggc	gtc	agc	gac	gtg	ttc	gcc	tac	ccg	ggc	ggc	gcg	tcc	atg	gag		344
Cys	Gly	Val	Ser	Asp	Val	Phe	Ala	Tyr	Pro	Gly	Gly	Ala	Ser	Met	Glu		
	85					90					95						
atc	cac	cag	gcg	ctg	acg	cgc	tcc	ccg	gtc	atc	acc	aac	cac	ctc	ttc		392
Ile	His	Gln	Ala	Leu	Thr	Arg	Ser	Pro	Val	Ile	Thr	Asn	His	Leu	Phe		
100					105					110					115		
cgc	cac	gag	cag	ggc	gag	gcg	ttc	gcg	gcg	tcc	ggg	tac	gcg	cgc	gcg		440
Arg	His	Glu	Gln	Gly	Glu	Ala	Phe	Ala	Ala	Ser	Gly	Tyr	Ala	Arg	Ala		

120	125	130	
tcc ggc cgc gtc ggg gtc tgc gtc gcc acc tcc ggc ccc ggg gca acc			488
Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro Gly Ala Thr			
135	140	145	
aac ctc gtg tcc gcg ctc gcc gac gcg ctg ctc gac tcc gtc ccg atg			536
Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser Val Pro Met			
150	155	160	
gtc gcc atc acg ggc cag gtc cac cgc cgc atg atc ggc acc gac gcc			584
Val Ala Ile Thr Gly Gln Val His Arg Arg Met Ile Gly Thr Asp Ala			
165	170	175	
ttc cag gag acg ccc ata gtc gag gtc acc cgc tcc atc acc aag cac			632
Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile Thr Lys His			
180	185	190	195
aat tac ctt gtc ctt gat gtg gag gac atc ccc cgc gtc ata cag gaa			680
Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val Ile Gln Glu			
200	205	210	
gcc ttc ttc ctc gcg tcc tcg ggc cgt cct ggc ccg gtg ctg gtc gac			728
Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val Leu Val Asp			
215	220	225	
atc ccc aag gac atc cag cag cag atg gcc gtg ccg gtc tgg gac acc			776
Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val Trp Asp Thr			
230	235	240	

tcg atg aat cta cca ggg tac atc gca cgc ctg ccc aag cca ccc gcg 824

Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys Pro Pro Ala

245

250

255

aca gaa ttg ctt gag cag gtc ttg cgt ctg gtt ggc gag tca cgg cgc 872

Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu Ser Arg Arg

260

265

270

275

ccg att ctc tat gtc ggt ggt ggc tgc tct gca tct ggt gac gaa ttg 920

Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly Asp Glu Leu

280

285

290

cgc tgg ttt gtt gag ctg act ggt atc cca gtt aca acc act ctg atg 968

Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr Thr Leu Met

295

300

305

ggc ctc ggc aat ttc ccc agt gac gac ccg ttg tcc ctg cgc atg ctt 1016

Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu Arg Met Leu

310

315

320

ggg atg cat ggc acg gtg tac gca aat tat gcc gtg gat aag gct gac 1064

Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp Lys Ala Asp

325

330

335

ctg ttg ctt gcg ttt ggt gtg cgg ttt gat gat cgt gtg aca ggg aaa 1112

Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val Thr Gly Lys

340

345

350

355

att gag gct ttt gca agc agg gcc aag att gtg cac att gac att gat 1160
 Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile Asp Ile Asp
 360 365 370

cca gca gag att gga aag aac aag caa cca cat gtg tca att tgc gca 1208
 Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser Ile Cys Ala
 375 380 385

gat gtt aag ctt gct tta cag ggc ttg aat gct ctg cta caa cag agc 1256
 Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu Gln Gln Ser
 390 395 400

aca aca aag aca agt tct gat ttt agt gca tgg cac aat gag ttg gac 1304
 Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn Glu Leu Asp
 405 410 415

cag cag aag agg gag ttt cct ctg ggg tac aaa act ttt ggt gaa gag 1352
 Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe Gly Glu Glu
 420 425 430 435

atc cca ccg caa tat gcc att cag gtg ctg gat gag ctg acg aaa ggt 1400
 Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu Thr Lys Gly
 440 445 450

gag gca atc atc gct act ggt gtt ggg cag cac cag atg tgg gcg gca 1448
 Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met Trp Ala Ala
 455 460 465

caa tat tac acc tac aag cgg cca cgg cag tgg ctg tct tcg gct ggt 1496

Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser Ser Ala Gly
470 475 480

ctg ggc gca atg gga ttt ggg ctg cct gct gca gct ggt gct tct gtg 1544
Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly Ala Ser Val
485 490 495

gct aac cca ggt gtc aca gtt gtt gat att gat ggg gat ggt agc ttc 1592
Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp Gly Ser Phe
500 505 510 515

ctc atg aac att cag gag ctg gca ttg atc cgc att gag aac ctc cct 1640
Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu Asn Leu Pro
520 525 530

gtg aag gtg atg gtg ttg aac aac caa cat ttg ggt atg gtg gtg caa 1688
Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met Val Val Gln
535 540 545

tgg gag gat agg ttt tac aag gcg aat agg gcg cat aca tac ttg ggc 1736
Trp Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr Tyr Leu Gly
550 555 560

aac ccg gaa tgt gag agc gag ata tat cca gat ttt gtg act att gct 1784
Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val Thr Ile Ala
565 570 575

aag ggg ttc aat att cct gca gtc cgt gta aca aag aag agt gaa gtc 1832
Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys Ser Glu Val

580	585	590	595	
cgt gcc gcc atc aag aag atg ctc gag act cca ggg cca tac ttg ttg				1880
Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro Tyr Leu Leu				
	600	605	610	
gat atc atc gtc ccg cac cag gag cat gtg ctg cct atg atc cca att				1928
Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met Ile Pro Ile				
	615	620	625	
ggg ggc gca ttc aag gac atg atc ctg gat ggt gat ggc agg act gtg				1976
Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly Arg Thr Val				
	630	635	640	
tat taatctataa tctgtatggt ggcaaagcac cagcccggcc tatgtttgac				2029
Tyr				
ctgaatgacc cataaagagt ggtatgccta tgatgtttgt atgtgctcta tcaataacta				2089
aggtgtcaac tatgaaccat atgctcttct gttttacttg tttgatgtgc ttggcatggt				2149
aatcctaatt agcttcctgc tgtctagggt ttagtggtgt tgttttctgt aggcatatgc				2209
atcacaagat atcatgtaag tttcttgtcc tacatatcaa taataagaga ataaagtact				2269
tctatgtaaa aaaaaaaaaa aaaaa				2294

<211> 644

<212> PRT

<213> Oryza sativa var. kinmaze

<400> 6

Met Ala Thr Thr Ala Ala Ala Ala Ala Ala Ala Leu Ser Ala Ala Ala
1 5 10 15

Thr Ala Lys Thr Gly Arg Lys Asn His Gln Arg His His Val Leu Pro
20 25 30

Ala Arg Gly Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser
35 40 45

Pro Val Thr Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro
50 55 60

Trp Gly Pro Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala
65 70 75 80

Leu Glu Arg Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala
85 90 95

Ser Met Glu Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn
100 105 110

His Leu Phe Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr
115 120 125

Ala Arg Ala Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro
130 135 140

Gly Ala Thr Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser
145 150 155 160

Val Pro Met Val Ala Ile Thr Gly Gln Val His Arg Arg Met Ile Gly
165 170 175

Thr Asp Ala Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile
180 185 190

Thr Lys His Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val
195 200 205

Ile Gln Glu Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val
210 215 220

Leu Val Asp Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val
225 230 235 240

Trp Asp Thr Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys
245 250 255

Pro Pro Ala Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu
260 265 270

Ser Arg Arg Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly
275 280 285

Asp Glu Leu Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr
290 295 300

Thr Leu Met Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu
305 310 315 320

Arg Met Leu Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp
325 330 335

Lys Ala Asp Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val
340 345 350

Thr Gly Lys Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile
355 360 365

Asp Ile Asp Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser
370 375 380

Ile Cys Ala Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu
385 390 395 400

Gln Gln Ser Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn
405 410 415

Glu Leu Asp Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe
420 425 430

Gly Glu Glu Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu
32/56

435	440	445
Thr Lys Gly Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met		
450	455	460
Trp Ala Ala Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser		
465	470	475 480
Ser Ala Gly Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly		
485	490	495
Ala Ser Val Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp		
500	505	510
Gly Ser Phe Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu		
515	520	525
Asn Leu Pro Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met		
530	535	540
Val Val Gln Trp Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr		
545	550	555 560
Tyr Leu Gly Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val		
565	570	575
Thr Ile Ala Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys		
580	585	590

Ser Glu Val Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro
 595 600 605

Tyr Leu Leu Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met
 610 615 620

Ile Pro Ile Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly
 625 630 635 640

Arg Thr Val Tyr

<210> 7

<211> 2294

<212> DNA

<213> Oryza sativa var. kinmaze

<220>

<221> CDS

<222> (48)..(1979)

<400> 7

cccaaaccga gaaaccctcg ccgccgccgc cgccgccacc acccacc atg gct acg 56

Met Ala Thr

1

acc gcc gcg gcc gcg gcc gcc gcc ctg tcc gcc gcc gcg acg gcc aag 104

Thr Ala Ala Ala Ala Ala Ala Ala Leu Ser Ala Ala Ala Thr Ala Lys

5	10	15	
acc ggc cgt aag aac cac cag cga cac cac gtc ctt ccc gct cga ggc	152		
Thr Gly Arg Lys Asn His Gln Arg His His Val Leu Pro Ala Arg Gly			
20	25	30	35
cgg gtg ggg gcg gcg gcg gtc agg tgc tcg gcg gtg tcc ccg gtc acc	200		
Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser Pro Val Thr			
40	45	50	
ccg ccg tcc ccg gcg ccg ccg gcc acg ccg ctc cgg ccg tgg ggg ccg	248		
Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro Trp Gly Pro			
55	60	65	
gcc gag ccc cgc aag ggc gcg gac atc ctc gtg gag gcg ctg gag cgg	296		
Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala Leu Glu Arg			
70	75	80	
tgc ggc gtc agc gac gtg ttc gcc tac ccg ggc ggc gcg tcc atg gag	344		
Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala Ser Met Glu			
85	90	95	
atc cac cag gcg ctg acg cgc tcc ccg gtc atc acc aac cac ctc ttc	392		
Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn His Leu Phe			
100	105	110	115
cgc cac gag cag ggc gag gcg ttc gcg gcg tcc ggg tac gcg cgc gcg	440		
Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr Ala Arg Ala			
120	125	130	

tcc ggc cgc gtc ggg gtc tgc gtc gcc acc tcc ggc ccc ggg gca acc 488
 Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro Gly Ala Thr

135

140

145

aac ctc gtg tcc gcg ctc gcc gac gcg ctg ctc gac tcc gtc ccg atg 536
 Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser Val Pro Met

150

155

160

gtc gcc atc acg ggc cag gtc cac cgc cgc atg atc ggc acc gac gcc 584
 Val Ala Ile Thr Gly Gln Val His Arg Arg Met Ile Gly Thr Asp Ala

165

170

175

ttc cag gag acg ccc ata gtc gag gtc acc cgc tcc atc acc aag cac 632
 Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile Thr Lys His
 180 185 190 195

aat tac ctt gtc ctt gat gtg gag gac atc ccc cgc gtc ata cag gaa 680
 Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val Ile Gln Glu

200

205

210

gcc ttc ttc ctc gcg tcc tcg ggc cgt cct ggc ccg gtg ctg gtc gac 728
 Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val Leu Val Asp

215

220

225

atc ccc aag gac atc cag cag cag atg gcc gtg ccg gtc tgg gac acc 776
 Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val Trp Asp Thr

230

235

240

tcg atg aat cta cca ggg tac atc gca cgc ctg ccc aag cca ccc gcg 824
 Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys Pro Pro Ala
 245 250 255

aca gaa ttg ctt gag cag gtc ttg cgt ctg gtt ggc gag tca cgg cgc 872
 Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu Ser Arg Arg
 260 265 270 275

ccg att ctc tat gtc ggt ggt ggc tgc tct gca tct ggt gac gaa ttg 920
 Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly Asp Glu Leu
 280 285 290

cgc tgg ttt gtt gag ctg act ggt atc cca gtt aca acc act ctg atg 968
 Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr Thr Leu Met
 295 300 305

ggc ctc ggc aat ttc ccc agt gac gac ccg ttg tcc ctg cgc atg ctt 1016
 Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu Arg Met Leu
 310 315 320

ggg atg cat ggc acg gtg tac gca aat tat gcc gtg gat aag gct gac 1064
 Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp Lys Ala Asp
 325 330 335

ctg ttg ctt gcg ttt ggt gtg cgg ttt gat gat cgt gtg aca ggg aaa 1112
 Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val Thr Gly Lys
 340 345 350 355

att gag gct ttt gca agc agg gcc aag att gtg cac att gac att gat 1160

Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile Asp Ile Asp	
360 365 370	
cca gca gag att gga aag aac aag caa cca cat gtg tca att tgc gca	1208
Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser Ile Cys Ala	
375 380 385	
gat gtt aag ctt gct tta cag ggc ttg aat gct ctg cta caa cag agc	1256
Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu Gln Gln Ser	
390 395 400	
aca aca aag aca agt tct gat ttt agt gca tgg cac aat gag ttg gac	1304
Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn Glu Leu Asp	
405 410 415	
cag cag aag agg gag ttt cct ctg ggg tac aaa act ttt ggt gaa gag	1352
Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe Gly Glu Glu	
420 425 430 435	
atc cca ccg caa tat gcc att cag gtg ctg gat gag ctg acg aaa ggt	1400
Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu Thr Lys Gly	
440 445 450	
gag gca atc atc gct act ggt gtt ggg cag cac cag atg tgg gcg gca	1448
Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met Trp Ala Ala	
455 460 465	
caa tat tac acc tac aag cgg cca cgg cag tgg ctg tct tcg gct ggt	1496
Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser Ser Ala Gly	

470	475	480	
ctg ggc gca atg gga ttt ggg ctg cct gct gca gct ggt gct tct gtg	1544		
Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly Ala Ser Val			
485	490	495	
gct aac cca ggt gtc aca gtt gtt gat att gat ggg gat ggt agc ttc	1592		
Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp Gly Ser Phe			
500	505	510	515
ctc atg aac att cag gag ctg gca ttg atc cgc att gag aac ctc cct	1640		
Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu Asn Leu Pro			
	520	525	530
gtg aag gtg atg gtg ttg aac aac caa cat ttg ggt atg gtg gtg caa	1688		
Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met Val Val Gln			
	535	540	545
ttg gag gat agg ttt tac aag gcg aat agg gcg cat aca tac ttg ggc	1736		
Leu Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr Tyr Leu Gly			
	550	555	560
aac ccg gaa tgt gag agc gag ata tat cca gat ttt gtg act att gct	1784		
Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val Thr Ile Ala			
	565	570	575
aag ggg ttc aat att cct gca gtc cgt gta aca aag aag agt gaa gtc	1832		
Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys Ser Glu Val			
580	585	590	595

cgt gcc gcc atc aag aag atg ctc gag act cca ggg cca tac ttg ttg 1880
 Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro Tyr Leu Leu

600 605 610

gat atc atc gtc ccg cac cag gag cat gtg ctg cct atg atc cca att 1928
 Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met Ile Pro Ile

615 620 625

ggg ggc gca ttc aag gac atg atc ctg gat ggt gat ggc agg act gtg 1976
 Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly Arg Thr Val

630 635 640

tat taatctataa tctgtatggt ggcaaagcac cagcccggcc tatgtttgac 2029
 Tyr

ctgaatgacc cataaagagt ggtatgccta tgatgtttgt atgtgctcta tcaataacta 2089

aggtgtcaac tatgaaccat atgctcttct gttttacttg tttgatgtgc ttggcatggt 2149

aatcctaatt agcttctctgc tgtctagggt tgtagtgtgt tgttttctgt aggcatatgc 2209

atcacaagat atcatgtaag tttcttgtcc tacatatcaa taataagaga ataaagtact 2269

tctatgtaaa aaaaaaaaaa aaaaa 2294

<210> 8

<211> 644

<212> PRT

<213> Oryza sativa var. kinmaze

<400> 8

Met Ala Thr Thr Ala Ala Ala Ala Ala Ala Ala Leu Ser Ala Ala Ala
1 5 10 15

Thr Ala Lys Thr Gly Arg Lys Asn His Gln Arg His His Val Leu Pro
20 25 30

Ala Arg Gly Arg Val Gly Ala Ala Ala Val Arg Cys Ser Ala Val Ser
35 40 45

Pro Val Thr Pro Pro Ser Pro Ala Pro Pro Ala Thr Pro Leu Arg Pro
50 55 60

Trp Gly Pro Ala Glu Pro Arg Lys Gly Ala Asp Ile Leu Val Glu Ala
65 70 75 80

Leu Glu Arg Cys Gly Val Ser Asp Val Phe Ala Tyr Pro Gly Gly Ala
85 90 95

Ser Met Glu Ile His Gln Ala Leu Thr Arg Ser Pro Val Ile Thr Asn
100 105 110

His Leu Phe Arg His Glu Gln Gly Glu Ala Phe Ala Ala Ser Gly Tyr
115 120 125

Ala Arg Ala Ser Gly Arg Val Gly Val Cys Val Ala Thr Ser Gly Pro
41/56

130	135	140	
Gly Ala Thr Asn Leu Val Ser Ala Leu Ala Asp Ala Leu Leu Asp Ser			
145	150	155	160
Val Pro Met Val Ala Ile Thr Gly Gln Val His Arg Arg Met Ile Gly			
	165	170	175
Thr Asp Ala Phe Gln Glu Thr Pro Ile Val Glu Val Thr Arg Ser Ile			
	180	185	190
Thr Lys His Asn Tyr Leu Val Leu Asp Val Glu Asp Ile Pro Arg Val			
	195	200	205
Ile Gln Glu Ala Phe Phe Leu Ala Ser Ser Gly Arg Pro Gly Pro Val			
	210	215	220
Leu Val Asp Ile Pro Lys Asp Ile Gln Gln Gln Met Ala Val Pro Val			
225	230	235	240
Trp Asp Thr Ser Met Asn Leu Pro Gly Tyr Ile Ala Arg Leu Pro Lys			
	245	250	255
Pro Pro Ala Thr Glu Leu Leu Glu Gln Val Leu Arg Leu Val Gly Glu			
	260	265	270
Ser Arg Arg Pro Ile Leu Tyr Val Gly Gly Gly Cys Ser Ala Ser Gly			
	275	280	285

Asp Glu Leu Arg Trp Phe Val Glu Leu Thr Gly Ile Pro Val Thr Thr
290 295 300

Thr Leu Met Gly Leu Gly Asn Phe Pro Ser Asp Asp Pro Leu Ser Leu
305 310 315 320

Arg Met Leu Gly Met His Gly Thr Val Tyr Ala Asn Tyr Ala Val Asp
325 330 335

Lys Ala Asp Leu Leu Leu Ala Phe Gly Val Arg Phe Asp Asp Arg Val
340 345 350

Thr Gly Lys Ile Glu Ala Phe Ala Ser Arg Ala Lys Ile Val His Ile
355 360 365

Asp Ile Asp Pro Ala Glu Ile Gly Lys Asn Lys Gln Pro His Val Ser
370 375 380

Ile Cys Ala Asp Val Lys Leu Ala Leu Gln Gly Leu Asn Ala Leu Leu
385 390 395 400

Gln Gln Ser Thr Thr Lys Thr Ser Ser Asp Phe Ser Ala Trp His Asn
405 410 415

Glu Leu Asp Gln Gln Lys Arg Glu Phe Pro Leu Gly Tyr Lys Thr Phe
420 425 430

Gly Glu Glu Ile Pro Pro Gln Tyr Ala Ile Gln Val Leu Asp Glu Leu
435 440 445

Thr Lys Gly Glu Ala Ile Ile Ala Thr Gly Val Gly Gln His Gln Met
450 455 460

Trp Ala Ala Gln Tyr Tyr Thr Tyr Lys Arg Pro Arg Gln Trp Leu Ser
465 470 475 480

Ser Ala Gly Leu Gly Ala Met Gly Phe Gly Leu Pro Ala Ala Ala Gly
485 490 495

Ala Ser Val Ala Asn Pro Gly Val Thr Val Val Asp Ile Asp Gly Asp
500 505 510

Gly Ser Phe Leu Met Asn Ile Gln Glu Leu Ala Leu Ile Arg Ile Glu
515 520 525

Asn Leu Pro Val Lys Val Met Val Leu Asn Asn Gln His Leu Gly Met
530 535 540

Val Val Gln Leu Glu Asp Arg Phe Tyr Lys Ala Asn Arg Ala His Thr
545 550 555 560

Tyr Leu Gly Asn Pro Glu Cys Glu Ser Glu Ile Tyr Pro Asp Phe Val
565 570 575

Thr Ile Ala Lys Gly Phe Asn Ile Pro Ala Val Arg Val Thr Lys Lys
580 585 590

Ser Glu Val Arg Ala Ala Ile Lys Lys Met Leu Glu Thr Pro Gly Pro
44/56

595

600

605

Tyr Leu Leu Asp Ile Ile Val Pro His Gln Glu His Val Leu Pro Met

610

615

620

Ile Pro Ile Gly Gly Ala Phe Lys Asp Met Ile Leu Asp Gly Asp Gly

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Arg Thr Val Tyr

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